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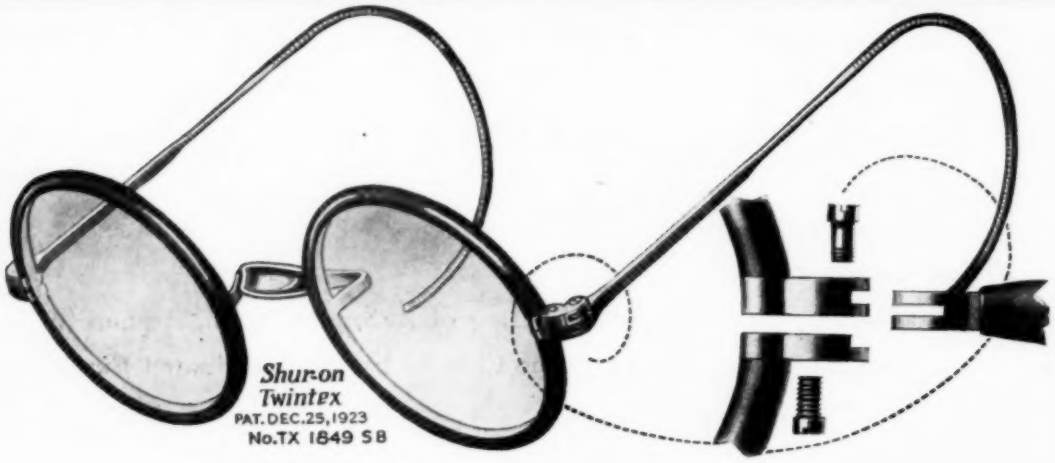


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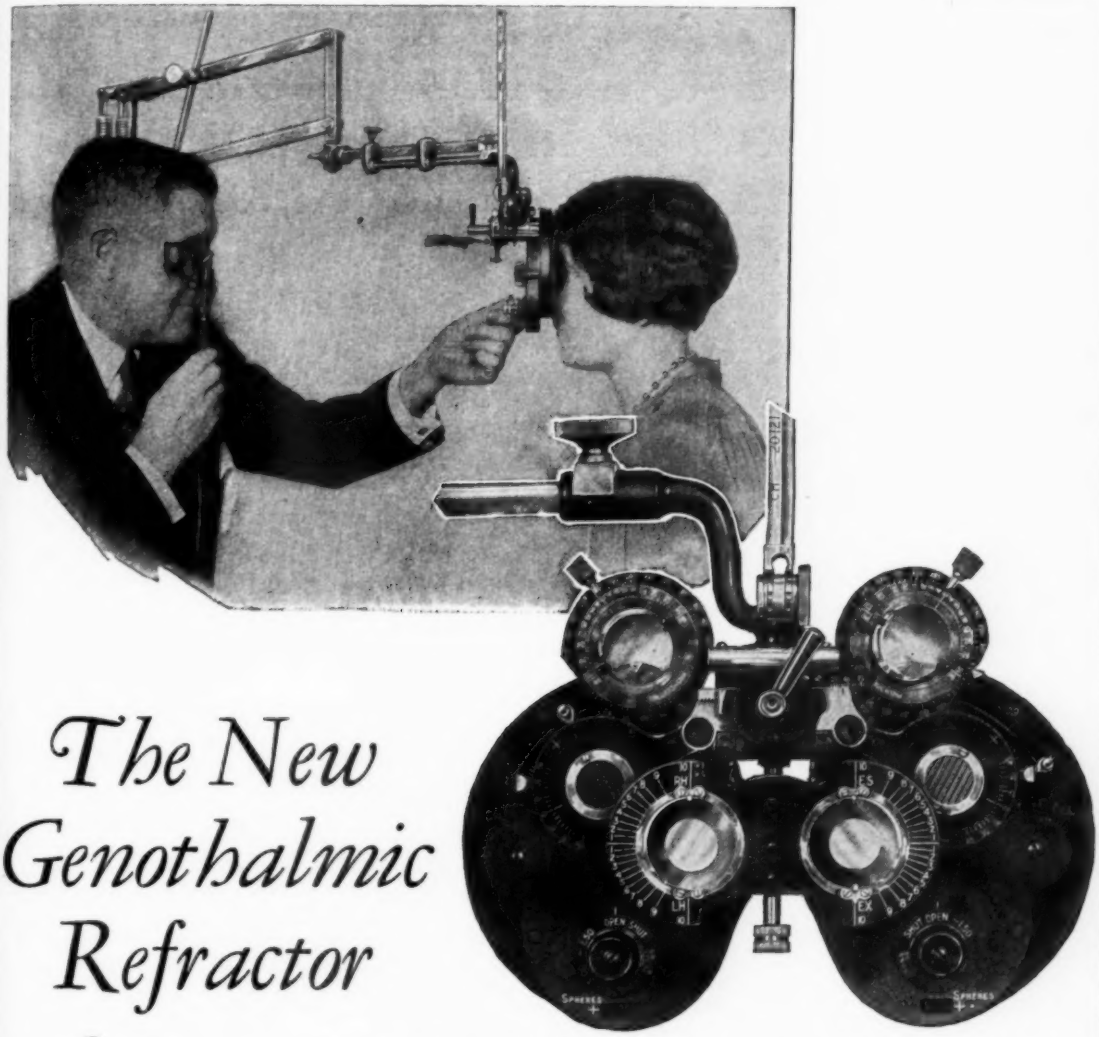

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AMERICAN JOURNAL OF OPTOMETRY
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# ACCOUNTING FOR THE SKIAMETRIC LAG OF ACCOMMODATION, BECAUSE OF THE FOCAL PENETRATION OF THE CHORID BY THE ILLUMINATED FUNDAL AREA

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The use of skiametry, as an objective method of measuring refractive errors of the eyes, has opened a new and wide avenue of investigation, but, like all new fields of discovery, that which once seemed simple and easily understood proves to have many hidden springs not so easily touched. This has been especially true of skiametry, perhaps because the instrument first used proved measurably satisfactory in the beginning, and has not thus far received the intensive study it deserves. Unaccountable discrepancies are often encountered in unexplored scientific fields, and those of skiametry are no exception.

Several types of light source are used in skiametric work. The Argand burner gives a rather even distribution of light over the area of the chimney orifice, and is in turn projected upon the fundus by the mirror. The source of light, however, is often an electric light, a convenient form of which is a round globe having a sort of clear window through a ground glass. A spiral filament is used in this globe, which is usually covered with asbestos, and two apertures through this material are available, the brightly illuminated ground glass area, or the clear glass window through which the filament is seen.

The much more convenient hand instrument contains its own source, and this is usually the open filament of the small lamp, although one instrument is now made with a diffusing screen over it. In whatever form used, we shall consider the lamp as the primary illuminator, while the illuminated area of the retina is known as the secondary illuminator, or the "source" of light in skiametric work.

But in order to distinguish the real meanings of our terms, and that we may clearly define the elements of skiametry, we shall call the illuminated fundal area the "crest of light," or merely the "crest." From the crest a beam is projected back through the media of the observed eye, the interposed lenses, the orifice of the skiascope, and eventually reaches the retina of the observer. This impingement is the "reflex" and exists nowhere but upon the fundus of the observer.

There are two entirely distinct trains of waves which must be considered, each of which is a separate mathematical and physical problem. The intensity of illumination in the area of the crest is governed by the several factors of the intensity of the primary illuminator, distance through which the light travels, type of mirror, objective pupil, transparency of ocular media, and character of the recipient fundus. If there are facilities for narrowing the beam of light, or for bringing it nearly to focus, illumination will be greatly increased in the central area of the crest. The various interposed lenses have a measurable, but slight, influence upon this focalization, but the cornea and the lens of the objective eye, amounting to nearly 60 diopters of focal power, are able to nearly or quite focalize any entrant beam. Because of two factors which consists of high illumination and cornea lenticular focalization, a brilliant zone of light is projected by the filament and a crest of intense illumination is presented for study. This being the case, the factor

[A portion of this material, with illustrations shown herein, appeared under the title, "Some Further Investigations on the Problem of the Lag of Accommodation" in the *American Journal of Physiological Optics*, Volume 7, Number 4. The Author, Dr. McFadden has, however made certain changes and has added much of interest to his original thesis. Editor—*American Journal of Optometry*.]

of penetration into the ocular membranes becomes a highly important factor, and one which seems hitherto to have entirely escaped the notice of skiametrists.

If we place the naked skiascopic lamp, or the ophthalmoscopic lamp in our tightly closed fist, in a dark room, the flesh of the whole hand becomes quite translucent, having a pale pinkish glow. Place the bulb in the mouth, closing the lips, and we observe that the cheeks are translucent although there is at least an inch of flesh, which is penetrated. Place the same bulb upon the eyeball of a consultant, and the interior of the globe is sufficiently illuminated to allow us to look within, lenses being suitably arranged for the purpose. This is more conveniently done with a transilluminator which is pressed upon the lid, as close to the orbit as possible. This transilluminator beam penetrates the lid, sclera, choroid, and retina, a distance through tissue of several millimeters, and one of those tissues is the dark choroid itself. These facts are familiar to us all and we shall have occasion to refer to them presently.

The stroma of the retina is a perfectly transparent membrane through which the picture of what we see penetrates without hindrance. This stroma offers no resistance to the passage of light, and it successively passes the several layers of nerve cells and plexiform layers of nerve fibrils to fall upon the deepest strata, the rod and cone layer. Thus far there has been no direct interference with the progress of the light beam which is to form the "crest of light," as we term the illuminated retinal area.

The choroid membrane is chiefly composed of a mass of arteries, arterioles, veins and capillaries, all of which are filled with blood and lymph. In all arterial walls there are both muscular and elastic fibres, these of course being present in the choroid. The lamina vasculosa, or external layer of the choroid, consists chiefly of the vena vorticosae, the larger branches of the ciliary arteries, and dark pigment cells. The lamina chorio-capillaris, or inner layer, consists of a very fine capillary plexus formed by the short ciliary vesicles. The pigment becomes less in amount as we pass inward from the cornea, or deeper into the socket, being entirely absent in the chorio-capillaris and the basilar lamina. Thus the choroid is no simple structure, but on the contrary one of high complexity.

The tapetum is a layer of nutritive tissue of the choroid, in contact with the retina. In such ruminants as the ox it consists of wavy connective tissue fibres, while in the carnivora, as the cat, dog and so forth, it is made up of plate like cells. But in any of these types, where there is found a brilliant reflecting surface, it is known as the tapetum lucidum. In man, the tapetum is rudimentary, although there are said to be instances where a peculiarly brilliant reflex is observable in children. This appears to pass away as the child advances into adolescence. In the main, however, man has no tapetum in the sense that it is a brilliant reflecting surface like that seen in specimens of the eyes of the ox. Whatever function it performs in other vertebrates, it appears that man has adapted himself to do without this membrane.

The sclera is a compact tissue composed of elastic fibres and flattened tissue corpuscles. It is tough, dense, and its inner layer is considerably pigmented, but it is neither so dense nor so deeply pigmented that light from the transilluminator does not penetrate, as we have seen.

There is not the slightest warrant for our usual assumption that the crest falls upon the retina, and is reflected by it to form our reflex, since the crest cannot be interrupted and reflected by this membrane to any appreciable measure. If man had a tapetum lucidum he would expect this brilliant reflector to throw back the crest without much penetration of it into the choroid. This experiment is readily made upon prepared specimens of the choroid of the ox, where we find that a crest is practically invisible upon the back of the choroid. But man's choroid does not thus refuse entrance to the crest, and indeed it does not offer very great resistance to complete penetration.

The brilliancy of the crest, due to the powerful primary source of light, with the focusing power of the cornea and crystalline, combine to form a factor of high penetration which is roughly comparable to a beam of light from an automobile headlamp projected into a fog. A very brilliant crest will not be **entirely** damped out until it has pene-

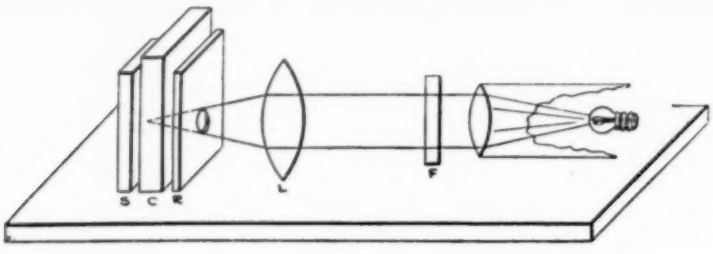


Fig. 1 (A)

trated a considerable depth of the sclera itself.

In skiametric work, our purpose is to measure the dioptric depth of the eye from its nodal point to the rod and cone layer of the retina, but the pencil of light is not stopped nor absorbed by the transparent retina. The consequence is that our estimates are likely to be largely founded upon an error of judgment and observation, unless we take precautions which appear to have thus far escaped our notice.

The elements of an experimental eye, together with the principal factors of the skiascope are shown in Fig. 1.

A beam of light is projected through a very thin plate of gelatin or isinglass, indicated by **R.** This plate is just perceptibly abraded in order that we may see the point at which the beam of light is incident upon its surface, for if this membrane is perfectly smooth we cannot so readily see the place where the beam penetrates. **C** is a plate of red glass which is intended to resemble the choroid. The depth of color is not sufficient to entirely absorb the beam, although it largely damps it out. We dispense with a pigment layer upon its posterior surface for reasons which will now be apparent. **S** is a pane of ground glass, playing the part of the sclera. The beam of white light from the skiascope lamp penetrates **R** and **C,** to be readily seen as a red area upon **S.** The choroid has taken out all rays but the red. We remember that it is a reddish hue which we usually observe in our reflex, although there are other hues and tints which are due to other causes quite outside the scope of this article.

If we could cause a red-free beam to fall upon the fundus of this experimental eye, we would have a means of quickly eliminating the beam which penetrates or enters the choroid. Therefore, we have only to filter out the rays which are complimentary to red, by placing a suitable filter glass in the light path. In this experiment, we make use of a piece of green glass, **F,** although this color is not a true compliment to red, but will serve the purpose roughly. With the green filter in the light path, we find that the red light which before penetrated the red glass **C,** and fell upon the ground glass **S,** no longer reaches that plate, having been entirely quenched. A filter which is truly complimentary to red is a bluish green, but a filter which is a correct complement to the choroidal glow must have certain other and rather definite, characteristics. By quite effectually estopping the choroidal crest, we shall have a pale supra-choroidal crest, which is to say that it will be as nearly a retinal crest as is attainable. In accomplishing this, however, we shall have a reflex of an entirely different hue from that which we are accus-

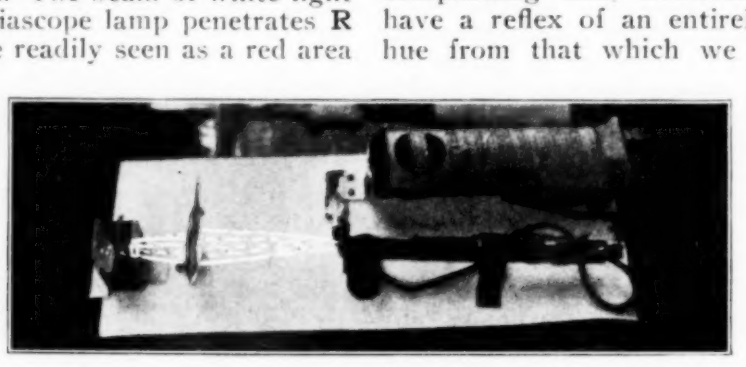

Fig. 1. (B)

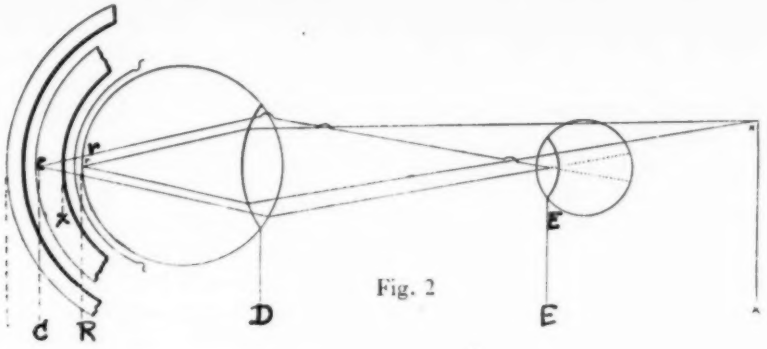


Fig. 2

tomed to see. For this hue partakes largely of the color of the filter.

There is a great deal of difference in the fundi of people. Albinos have a very little pigment in the choroid, while negroes and mulattoes are deeply pigmented. Brunettes are usually possessed of more deeply hued fundi than blondes. Characteristically, all these types of fundi return reflexes of various intensities, due to the susceptibility of their choroids to penetration, or their ability to quickly damp out or absorb the penetrating beam. There are occasional cases where we can see the sclera through the choroid, giving the characteristic tessellated fundus, the choroidal vessels, showing up against the light yellow background as dark red lines. These cases are unusual but they nevertheless serve to prove to us that the choroid plays a highly important part in skiametric work.[1]

Helmholtz gives the thickness of the retina at the back as about 0.22 mm. and at the ora serrata as about 0.09 mm. The thickness of the choroid at the back is about 0.75 mm. to 1.0 mm. In figure 2, **R** represents the position of the retinal plane, **C** the posterior of the choroid, and the space **R-C** the depth through which the crest may free penetrate unless absorbed. It is evident that if **c** is conjugate to **E** through the lens system of the subjective eye, then manifestly **R** is not conjugate, nor can any point between **c** and **r** be conjugate to **E.** Moreover, if **c,** or any other point as **x,** is conjugate to **E,** through the dioptric system system **D** then **R** is conjugate to some other point than **E,** as **X.** If we have conducted our measurements and calculations so that **D** remains a constant, then **r** must be conjugate to some more distant point, as **X,** and the dioptral power indicated by **DE** is greater than that of **DX.** (See Figure 2.)

Making use of the formula in which **D** represents the focal power of a lens or a lens-system in dioptres, (figure 3), **Di** equals the distance of the image from the lens, measured in dioptric, or wave-power distance, and **Do** the distance of the object from the lens, then,

$$D = Di + Do, \text{ and } Di = D - Do$$

(See Figure 3.)

Tscherning gives the average dioptral power of the eye as about 58.D, but we will assume 60, for convenience in estimates. If the node of the observing eye **E** is 33.3 mm. distant from the node of the subjective eye, **D,** substitution in the formula gives us:

$+3.D = 60.D - Do.$, whence, by transposition

$+3. - 60. = -Do.$, or $Do = 57.D$

$$\frac{1000 \text{ mm}}{57.D} \left\{ \begin{matrix} \text{the focal length of} \\ \text{a one-dioptre lens} \end{matrix} \right\} =$$

17.544 mm focal distance.

Sheard[2] has conclusively shown us that there is an evident discrepancy between convergence distance and apparent accommodative distance. Conclusions which have been drawn from Cross also lead to a somewhat similar interpretation. Lawrence has touched

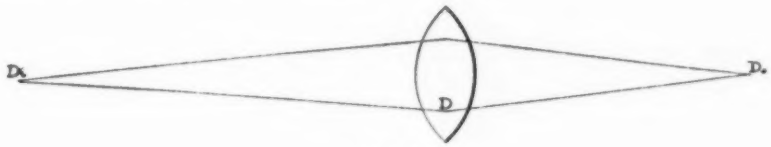


Fig. 3

upon the subject, and Nott[3] has made a number of original investigations from which he deduces a certain factor of "lag." Harry M. Bestor[4] concludes that one hundred thirty-nine cases taken from his files are a fair cross section of the apparent difference between accommodative distance and convergence distance in his daily practice. "Fifty-seven or approximately 30 per cent, correspond within 0.25 to 1.00 D; thirty-five, or approximately 20 per cent, correspond within 0.25 to 0.50 D; and forty-seven, or approximately 23 per cent, correspond within 0.50 to 1.00 D." And Sheard[5] says that "We have much evidence to support the statement that there is always a lag of accommodation behind convergence of an amount generally varying between 0.50 and 1.00 D, depending upon the fixation distance. By this statement we mean for example, that if the finding, with equal fixation and observation distance of one meter, should be + 3.00 D, then, allowing 0.50 D for lag of accommodation, the finding of + 2.50 D is found to represent the refractive error, as is substantiated generally by other tests, both with and without cycloplegics."

Moreover the daily practices of a host of careful observers apparently agree in the main with the conclusions above cited. From this we are led to the almost inevitable conclusion, apparently, that the well known and easily determinable convergence distance at which a consultant must work will be somewhat less than the focalization distance of the eyes, and that some plus-power is required above that indicated.

But if these things are true with respect to convergence distances even as great as one meter, why are they not also measurably true with respect to distance in which convergence is zero, or practically so? We briefly quote from Sheard again, (whose experience is also apparently that of many others, and of our own daily experiences) when he says that he "has worked for years at about 26 to 30 inches and allowed one dioptre only, instead of a dioptre and a half, for the working distance, and has found that the skiascopic findings thus obtained, approximated very closely the binocular prescription finally determined upon in the majority of cases presenting no peculiar or marked conditions of muscular imbalance or accommodative anomalies." This means that a distance of 26 to 30 inches is taken for operating and that a compensating lens of + 1.50 D is either actually placed in the refractor, or is assumed to be there. In either case, this amount is supposed to be deducted algebraically, from the final findings, but if we only deduct + 1.00 D. from these findings we have in reality added + 0.50 D to our apparent correction, hence the "lag" is present even though fixation is at infinity.

Thus, from all available sources, the conclusion seems justifiable that the skiascopic findings are somewhat less than the actual error, and there is a harmony of evidence that this shortage is from 0.50 D upward, but that it does not exceed 1.00 D. And apparently we find harmony of evidence in both static and so-called dynamic skiametric estimates.

If we make an allowance of 0.25 D, 0.50 D, 0.75 D, and 1.00 D respectively from the figures substituted in the formula previously given, we shall have

57 D — 0.25 D = 56.75 D, or 17.621 mm. focal distance.

57 D — 0.50 D = 56.50 D, or 17.699 mm. focal distance.

57 D — 0.75 D = 56.25 D, or 17.777 mm. focal distance.

57 D — 1.00 D = 56.00 D, or 17.854 mm. focal distance.

If 57 D represents practically normal ocular dioptral power, according to Tscherning, and the focal distance, under the conditions specified, is 17.544 mm., then

0.25 D allowance, 17.621 — 17.554 = 0.067 mm.

0.50 D allowance, 17.669 — 17.554 = 0.115 mm.

0.75 D allowance, 17.777 — 17.554 = 0.223 mm.

1.00 D allowance, 17.854 — 17.554 = 0.300 mm.

If the focal penetration of the choroid by the crest is equivalent to from 0.06 mm. to 0.3 mm. before we secure complete inversion of reflex we have satisfactorily accounted for the "lag." That this penetration actually occurs there is not the slightest doubt, since strong light penetrates living tissue to a considerable extent, and the powerful ocular focalization, amounting to nearly 60D, must have no inconsiderable deep-tissue illumination. That this occurs in a deeply pigmented membrane is well known, but the pig-

mentation is by no means deep enough to stop the light at its incident surface.

By means of suitable filters, we may project a beam which is complimentary in color, to the average choroid. By doing this the penetration is stopped very much sooner; in fact is almost quenched at the incident surface. For any light which has thus filtered and penetrated this membrane must also retrace its path through the membrane before it can possibly become a portion of the reflex. It is of course apparent that the character and type of reflex will remain unaltered, but it is also evident that its hue will partake of the color of the filter used.

With either the Argand lamp or electric bulb in any form, a brilliant crest will result, but the nature of the filament is such that a crest from it will have a concentrated area of considerable penetration which will not as quickly "damp out" as that from the Argand crest. The natural consequence is that considerable variation will occur if the two types of primary illuminators are used upon a case. The light of higher penetration will damp out more slowly before being full quenched, in consequence of which we shall notice a decided variation in the value of the lens which represents the factor of "lag." Another factor is that of the character or hue of the crest, since any filter should be so selected as to be complimentary not alone to the average choroidal hue, but to the characteristics of the light, from whatever source derived.

Both Sheard and Bestor have noted that the lag varied from 0.50 to 1.00 D. and Bestor finds that quite a proportion show a lag of 0.25 D. These amounts are readily accountable for by penetrations of the choroid by distances varying from 0.067 mm. to 0.3 mm.; all of which looks reasonable in connection with the various experiments undertaken. If we accept these facts, how shall we conduct our examinations in order to embody the apparent error in our findings? It is not good practice to add arbitrarily some specific power to our findings, since choroidal depths undoubtedly vary, and density of pigmentation also varies even more widely.

Skiametry, in spite of the fact that it has been in use for a score or two years, is still relatively a new subject, and is very poorly understood by the majority of refractionists. While it seems a perfectly simple matter to neutralize the movement of a reflex, yet there are so many physical and physiological elements involved that we find it necessary to proceed most carefully. The first skiascope was a bit of mirror over which the observer peeped. This has been improved upon from time to time, in a rather cursory and limited way, the main improvement being merely a hole in the glass or in the reflecting element, through which the observer could peep. The former kerosene gas or Argand lamp has been replaced by the more convenient, but at the same time, more highly penetrating electric filament. This, however, is good practice, since it has enabled us to distinguish a wide variety of reflexes which never appeared with low illuminants. But the penetration exists in either case. The inherent defects of the present instrument are indeed a counterpart of the apparent misconceptions respecting its manipulation. We have taken too much for granted, have relied too implicitly upon the apparent simplicity of the procedure, as well as upon the simpleness of the pierced mirror.

Fundi having different degrees of pigmentation will permit of deeper penetration by the crest. Fundi will vary in thickness in different individuals, hence will return a variety of reflexes in proportion to the depths. We are perfectly safe in this assumption of varying thicknesses from the fact of such variation in all other organs or membranes in man. Penetration will vary with illumination, due in part to pupillary width, transparency of media, and several other factors. No hard and fixed law should be laid down, no definite deductible amount for "penetrative lag" can possibly be set. We must construct our instruments so as to encompass the variations encountered, but more than all, we must train our visual sense to observe what is actually taking place, not what we imagine ought to occur.

Proceeding upon the supposition that our filter causes a green-hued reflex, we should so manipulate the filter so as to cause the sub-choriodal crest to nearly quench the light, leaving only the supra-choroidal crest. This will be distinguished by the slightest shade of hue upon the retino-choroidal juncture. The reflex from this is tenuous, trans-

parent, highly evanescent. This requires us to adopt a new technique, or at least to cultivate our present acuity of perception to a higher sensibility, which is not as difficult as it sounds for it simply means that we must train ourselves to see what we look at.

Many refractionists distrust their "retinoscopic" findings, and it is not difficult, in view of the facts just noted, to understand why the results fail to tally with subjective work. We take altogether too much for granted in all optometric work, accepting a large number of our "rules" with all the sanctity of tradition. As a matter of fact there are almost none of our refractive rules or laws which should not undergo most radical revision just as other fields of scientific work have been practically torn to pieces, melted and recast. We speak "by the book" of "retinoscopy," and do so with the full knowledge that the living retina is almost if not fully as transparent as the aqueous and vitrious humors. We are working with a "shadow-test" where we study the most delicate differences between light and shade. The name of this kind of analysis is Skiametry, or a measurement of shadow, never retinoscopy, or seeing the retina. A thing properly named is half understood, but one illegally named is forever misconstrued.

We can not expect to reflect a penetrating beam into a living eye and have it reflected by a transparent membrane particularly when that membrane is in actual contact with the aqueous on its anterior side. If a reflection were to occur upon this surface it would be at the neural stroma, not within the belt of rods and cones. If man had a reflecting membrane like the tapetum of some other creatures we would have a stop-surface readily available, but having no such membrane the crest of light must and certainly does penetrate to some appreciable distance within the choroid.

If we cared to follow out a line of side reasoning which has no direct bearing upon the subject of this paper we could point out several important truths, one of which is that the circulatory system of the choroid is admirably adapted to absorb and disperse a large amount of heat derived from focalization. Another is that of absorption and consequent destruction of light after it has served its stimulative purpose it must receive quick annihilation in order that succeeding waves may also stimulate in turn.

The retina, then, is but a "bird of passage," a landing place where waves may tarry but an infinitesimal moment to leave their message whence they must pass on into choroidal eternity. Any skiascopic beam we can use must have sufficient volume and intensity—voltage and amperage, if we may make ourselves clearer by borrowing electrical terms—to illuminate some gross structure with sufficient intensity so that it will reflect a portion of the incident light from this crest and thus form a reflex upon the retina of the Optometrist. All skiametric measurements are actually made on or in the structure of the choroid, please remember. Our requirements are that the crest shall be formed at the shallowest possible depth of the choroid, just as near as possible to the cone layer.

The problem is not as difficult as it looks because of the hue of the choroid in its layer nearest the retina. By properly balancing its hue with that of a filter of a certain shade the penetrating beam is quenched early in its choroidal passage, the consequent reflected beam taking place very nearly where we wish. By reconstructing the skiascope so as to contain the correct hue of filter together with means for also controlling its intensity of hue rather than the candle-power, we have an instrument which is a revelation, and capable of giving results of very much greater exactitude than the rough apology now in common use. We have no need whatever of high illumination, tremendous candle-power, bright filament projections, but we require an entirely different arrangement of source-light and an adaptable filter system. With these facilities the discrepancy of "accommodative lag" vanishes, and there is no further need of making arbitrary deductions from skiametric findings so that the resultant focal length shall be the equivalent of the convergency distance.

With the best of Dr. Sheard's and Dr. Bestor's calculations, this cancellation must be varied all the way from 0.25 D. to 1.00 D. with no knowledge whatever as to the absorptive factor of the choroid where reflection took place.

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# REPORTED CASES

**W. S. Farmer, Opt. D.**
**Oklahoma City, Oklahoma**

### Inhibited Energy to Convergence Through Accomodation.

Dr. Roy (1), Memphis, Tenn., reported case man, age 35, complained of blurred distant and near vision, and pain behind each eye. Wearing O. D. +1.25 Sph., O. S. +1.00 +.25 x 105. Orthophoria at distant 1°, Eso. at near without lenses. Abduction 5/3, adduction 13/9 at distance. Abduction 26/16, adduction 25/9 at near. (First figure indicates diplopia point, second one the refusion point.)

Static retinoscopy +2.25 O. U.

Dynamic retinoscopy +2.00 O. U. +1.75 O. U. was prescribed which gave him 20/20 vision O. U. Additional plus blurred distant vision. With +1.75 O. U. he maintained orthophoria at distance, but his phoria at near changed from 1° Eso. to 10′ Exo. His ductions at infinity remained the same, but near adductions dropped to 8/0, while abduction at near remained stationary. With the removal of the lenses the near adduction or (positive reserve convergence) again measured 25/9, but decreased to 8/10 each time the lenses were put on, thereby showing that by blocking the flow of energy to acc. the energy to the internal recti. was also cut off. Since this case did not respond to exercises given by the Optometrist, who referred the case to Dr. Roy, he prescribed Bifocals with +1.75 uppers and 2½° base in plano segments, which relieved all symptoms complained of, and he reported absolute comfort, a month later.

This case is not unusual, but the method of relief is; which is the result of careful analysis on the part of Dr. Roy. He reasoned that the difference in the two prescriptions did not account for the great pain behind the eyes, so he looked farther, then he analyzed the effect of his prescription even before he prescribed it, and in the effect, he found the method of relief. It will be noted that in the above case the fusion power (the second figure) changed with near adduction, or (positive reserve convergence) which shows the close relationship of accomodative and convergence and fusion yet they are separate functions.

### Brow Headaches Relieved with Kratometer.

Dr. Tibbitts, Little Rock, Ark. (2), reports case of letter carrier, age 30, complaining of brow headaches, in afternoon and at night after reading.

Naked vision 20/20 O. U. Ophthalmometer O. D. —.50 x 180, O. S. —.75 x 165, Dynamic retinoscopy at 20″ O. D. +1.00 Sph., O. S. +.75 +.25 x75. 2° Exo. at 12 ft. 9° Exo. 16 inches, 10° convergence insufficiency.

Treatment: daily Kratometer exercises of 5 minutes for six weeks.

Results: The exo. at near remained the same, convergence insufficiency disappeared, together with his headaches.

One year later, June, 1927, patient having perfect comfort with his eyes, only once in a great while does he have any symptom of any brow headache.

### Minus Spheres Reduced With Kratometer.

Dr. Tibbitts (3), reports another case. February, 1927. Physician's daughter, age 16, had worn —1.25 Sph.

for 4 years. Naked vision each eye 20/80, above prescription necessary to give her 20/20.

Ophthalmometer —1.00 x 180 O. U.

Orthophoria at 12 ft. 1° Eso. at 14 inches Abb. 11/8. Gave her O. U. —.75 Sph. 2° base in prisms for constant use also daily relaxing (base in) exercises. April 15th —.50 Sph. each eye, 2° base in, gave her 20/20 each eye. Also her naked vision had increased to 20/40. Has gone away for summer, but expects to find vision near normal by fall.

### Plus Spheres Removed with Kratometer.

Dr. Farmer, Okla. City, Okla. (4), reports similar case on record, lady, age 30, wearing O. U. +.75 sphere complained of diplopia and pain when doing near work. 11° Alternating Exotropia at distance and 13° Exo. for near, without glasses.

11° Exotropia for dis., 15° Exo. for near with above correction. Marked alternating suspenopsia, 20 seconds per minute, of about 4 seconds' duration each. Gave Kratometer treatments base out, 10 minutes 3 times each week for 9 weeks.

Results: Suspenopsia, pain and diplopia all subsided. Complete relief and comfort. 4° Exophoria, adduction 16, abduction 10 for distance without glasses. 9° Exo., adduction 24, abduction 16, for near without glasses. No trouble for past 3 months.

### Exophthalmic Goiter.

Dr. Farmer (5), reports, bank teller, aged 30, presented himself for an examination 4/29/27. Had just been given a complete examination by prominent oculist of this city, but had told the oculist that he did not want to wear glasses. He was advised that there was nothing wrong with his eyes and advised to take more exercises, complained of being tired in P. M. Diplopia at near work, eyes watering a great deal, pain in orbital region. Our routine examination revealed the following, naked vision 20/20 O. D., 20/40 O. S., 12° Est. at distance 18° Est. at near, without glasses. O. D. +.50 +.50 x 90, O. S.+.50 +.50 x 45, with these lenses he had O. D. 20/20, O. S. 20/30. 6° Est. at distance, 9° Est. at near. In 10 days wearing the above correction constantly and taking relaxation Kratometer treatments 3 times each week, his phoria was 10° Est. for distance, 18° Est for near with correction. During treatments we noted his extreme nervous condition, and a gradual protrusion of both eyeballs; pulse ranged around 104 to 110 per minute. Patient said he was feeling good, and laughed when I advised him to have a complete physical examination by a good physician.

Since he was a close friend of mine I told him frankly that I suspected exophthalmic goiter. He again laughed, and stated he had had a complete examination by this same physician less than a year ago, but would go just to be sure. Two days later the physician called me, confirmed by diagnosis, and thanked me for my interest in his patient.

The patient was operated on and the goiter removed, one month ago. He was in to see me yesterday. We found his nervousness gone, his refraction as follows: O. D. +.50 x 90, O. S. +.50 x 45. No diplopia. Est. 9° for distance, 12° Eso. for near. He expects to return to work in a few days, and was very much pleased with the way we had handled his case. We will continue to watch this case with interest.

### Bibliography.

(1) Dr. Vance C. Roy, Optometrist, Columbian Mutual Tower, Memphis, Tenn.

(2)-(3) Dr. Frank I. Tibbitts, Optometrist, 722 Boyle Bldg., Little Rock, Ark.

(4)-(5) Dr. W. S. Farmer, Optometrist, 619-20 First Nat'l Bank Bldg., Okla. City, Okla.

# BOOK REVIEW

**The Study and Training of a Child Who Was Word-Blind.** By **Elizabeth E. Lord. The Aetiology of Congenital Word Blindness.** By **Walter E. Dearborn.** Harvard Monographs in Education, Series 1, Vol. XI, No. 1, June, 1925.

These two papers are extremely interesting and well written, yet they are very difficult to abstract. The conclusions can probably best be given by using the author's own summary:

"Clinical and pathological evidence from cases of aphasia support a theory of brain localization in so far as the various acquired forms point to more or less isolated defects of vision, audition and motor response, which are involved in speech. As stated by Howell: 'Each part is a distinct centre, but their combined use in intellectual life would imply that they are connected by association fibres, so that a lesion may affect only one of these various centres * * * although fundamentally distinct they are practically combined in activity.' In the psychological analysis of this case, all three centres concerned with speech (visual, auditory, and motor), present seeming abnormalities, and again we find that the question of defect is not confined to words and letters alone, but to sounds and numbers as well. In the pedagogical methods used we found that somewhat better results were obtained by appealing in the normal way to the visual memory than to either auditory or kinaesthetic memory. If our conclusions have been correctly drawn, so-called congenital word-blindness is not a pathological condition of a visual memory centre for words and letters, but is due to a defect in the association fibres; to insufficient associations between the sense areas and to lack of co-ordination in the motor response to visual and auditory stimuli."

The second paper is a full discussion of the literature available on the subject and the writer reaches the following conclusions:

"The upshot of our consideration of the literature of congenital word-blindness and of our experience with such cases is this: If there are specific defects in the centres or areas of the brain in which there is said normally to be deposited the visual memories of letters and words, these conditions will account for but a small proportion of the cases. Auditory difficulties, both central and peripheral must also be recognized, as well as muscular or kinaesthetic deficiencies and peculiarities. Secondly, there are cases which would appear to develop on a basis of pure habit, especially with a supporting background of neurotic or psychopathic behaviour, but perhaps more commonly these factors merely complicate or are in part the result of the first-named deficiencies. Finally, some of the factors which are ultimately responsible for the condition of word-blindness, or for the inhibiting habits which result in this condition, would appear to be inheritable."

J. I. K.

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## STUDENTS FOR OPTOMETRY SCHOOLS

From time to time we are reminded that there is a scarcity of optometry students both in the universities and in the private schools. This condition if permitted to continue will threaten not only the existence of the optometric educational institutions, but the existence of optometry itself. It is obvious that a school can not be maintained without students, and that a profession can not long flourish, progress and survive without getting in new blood, getting in new members to its ranks, which in time become depleted from various causes—natural or otherwise. This is a problem which calls for action and co-operation on the part of each optometric association, local, state and national. This condition can and must be dealt with. It calls for a permanent solution. But before a proper solution to this problem can be had we must first diagnose the seat of the trouble. What is causing this shortage in optometry students? Is it because that optometry is not very remunerative financially? This may have something to do with it, but it can not be the main cause. There are other professions, like pharmacy, civil engineering, chemistry, etc., which do not offer the student any greater financial returns than optometry, yet the enrollment in these colleges in nearly all the universities in the country is very great. Certainly no profession could progress or long endure if the only students entering it were made up of a group of "gold diggers" or "dollar chasers." Optometry in this respect is no exception. Is it because optometry does not carry the prestige the other older professions do? This may be partly true, however it can not have any direct effect nor be any determining factor in this case. For while the present day optometric practitioners are conscious of this fact, the high school student does not know much about this condition, neither would that influence his decision one way or the other even if he did know.

What then is the real cause of the lack of optometry students? As it seems to us the chief reason is that the class of young men entering or preparing to enter the different colleges and universities do not know about the existence of the profession of optometry. There are enough students turned away from the medical, dental and other colleges, because of the fact that more students wish to enroll than can be accomodated, to fill to capacity every school and college of optometry in the country. There is also a large number of freshmen students enrolled in the various technical colleges who wish to change to some other course at the end of the freshman year. Why do

not all or at least some of these students take up optometry? Because they are simply unaware of the existence of optometry. Our problem resolves itself as to how can we reach the high school students and university freshmen and supply them with this necessary information about optometry.

Now, just how can this be done? There are several ways, among them, first, the American Optometric Association could, by setting aside a certain amount of money to be used as prizes for the best essays written, by junior and senior high school students and by university freshmen, on the subject of optometry, its meaning, its relation to the public, its legal and educational requirements, arouse a great deal of interest. The machinery should be set up to notify all the high schools and colleges in the country annually about these prize essays, also for supplying information on the subject to interested students. If the national association can not take any action on this matter the state and local associations can easily take this in their own hands and follow out this plan.

Second. To create optometry scholarships would be another added stimulus.

Third. Local associations can reach the students directly by having a speaker at the high schools where it is possible to speak to the senior class, the subject being, "Choosing Optometry as Your Professional Life Work."

Fourth. The students who are turned away from the medical and dental schools because of lack of accomodation in these schools, should be approached in person or be communicated with through the mail, pointing out to them the advantages of becoming an optometrist.

Fifth. Let all the optometric publications devote some space periodically to advertise optometry and optometric schools, their locations, curricula and requirements so that the rank and file of the optometrists will not only get posted, but will also get interested in seeing to it that more students take up the study of optometry.

While nearly all of the suggestions outlined above will require some time to be put into operation and will probably bear some fruit within the next few years we must not at the same time forget the present. The month of August and the first part of September is a time when many young men and women will decide upon the course of study to take up. Each optometrist can help much if he will try to get in touch with some high school graduates in his district and tell them something about optometry, its advantages and opportunities.

Elsewhere in this Journal we are publishing for your guidance a list of all the optometry schools, which were accredited by the International Association of Optometric Examiners.

You as an individual can accomplish a great deal by making a special effort during the next month in this direction. Let us do as much as we can now, and plan to continue this work on a bigger and better scale next year.

J. I. K.

## OPTOMETRIC RECOGNITION

We frequently hear complaints from some optometrists that our profession is not getting the proper recognition it deserves, and others again claim that optometry is getting no recognition at all. The question at once presents itself—what shall we get recognition for? Recognition, one must remember, is usually given for accomplishing something new, something unusual, or for adding something to the sum-total of our present day knowledge. It will be well for us to stop for a moment and reflect as to what optometry accomplished recently which deserves recognition. Frankly speaking, one can find little to point to with pride.

Optometry having secured laws in every state in the Union feels it has reached its goal and has of late been in the main, sitting idly by, while other professions are moving forward.

We have been assuming a position of superiority when thinking of our brother optometrists in other parts of the world and we were looking forward to the time when they, too, could advance to our position. Right here is where we have made our greatest mistake. While we were "marking time," so to speak, and waiting for the optometrists in other countries to catch up with us, they have during that time not only done that, but some of them have advanced in the march of progress and are now somewhat above our average level. Particularly is this true of the optometrists in England. It may

be of interest to many to learn what they have been doing and accomplishing besides carrying on the battle for legal recognition.

One can learn about some of their activities and accomplishments from the columns of the British Journal of Ophthalmology. The book reviewer of that Journal tells us that the "Proceedings of the Optical Convention of 1926 is published in two volumes. Volume one contains 512 pages and Volume two 578 pages." This review goes on to say that "The two large volumes contain the reports of the proceedings of the Optical Convention held in London in 1926 and cover a surprisingly wide range. Several papers were read on each of the following subjects: optical theory, optical history and education, optical glass and the manufacture of optical instruments, astronomy, microscopy, spectroscopy, interferometry, photography, ophthalmology and spectacle manufacture, cinematography and projection, colour, photometry and illumination, surveying including aerial surveying, and optical apparatus in the Services.

"Several of these are of interest to refractionists. A paper on 'The influence of Illumination on Visual Acuity,' by Banister, Hartridge and Lythgoe, brought out the fact that while an artificial illumination of 2 to 4 foot-candles is most probably adequate for a variety of purposes, only about one-half of the full acuity of the eye is achieved at these intensities; for the maximum acuity an intensity of 100 to 200-foot candles is necessary. A 'mechanical theory of heterophoric correction,' suggested by J. B. Reiner, depended upon the postulate that the true anatomical position of rest for each eye is midway betwen the maximum rotation inwards and the maximum rotation outwards while the other eye is fixed upon an object in front. W. E. Barker dealt with some of the difficulties met with in prescribing glasses for the anisometrope, touching more especially upon the effect of decentration of the prescribed lenses and the use of bifocal lenses, while H. L. Taylor discussed the influence of facial asymmetry on the same problem. A comprehensive statistical report on the relative distribution of refractive defects was submitted by O. Aves, and a note on the transposition of obliquely crossed cylinders in irregular astigmatism into an equivalent sphero-cylindrical form was supplied by H. H. Emsley.

"On the more theoretical side of the subject, Professor Elliott Smith delivered a lecture on the evolution of the eye and its relation to the development of its functions. E. F. Fincham gave an illuminating account of his views on the mechanism of accomodation, described in this journal some time ago, presenting in detail the anatomical and physiological evidence he has accumulated during the last few years. Professor Peddie dealt with colour vision from the point of view of mathematical theory, and presented a new colour vision spectrometer for establishing colour matches and forming comparison spectra. One of the most interesting papers, which was followed by a suggestive discussion, was a discussion on the nature of light, introduced by Professor Lindemann, which dealt with the divergence between the electro-magnetic and the quantum theories, the outcome of which was a general feeling that the essence of the two conflicting views would eventually be reconciled and combined. Many papers are devoted to the description of complex, optical instruments, etc."

This speaks well for the English Optometrists. They have accomplished something worthwhile and are naturally given proper recognition for that, by the profession which is fighting them in every way possible on the matter of parliamentary recognition.

Some of the other accomplishments of the British Optometrists are:

First, the Refraction Hospitals, which have been organized, supported and conducted entirely by Optometrists. There are now two of these. Second, "The National Council for Optometric Research," which has recently been organized and whose aim is to advance optometric science through research work by the practitioners themselves. And third, The British Journal of Physiological Optics, a strictly scientific quarterly publication of the highest order. This is published by the council of the British Optical Association. This Journal does not carry any advertising and is edited and arranged in such a fine way that any profession could and would be proud of adding it to its literature.

These things are splendid. They show that optometry as a profession is making definite headway abroad and they also show us that we as American optometrists can ill afford to rest on our laurels. If American Optometry is to continue as the pacemaker its organized units must take up the inspirational work of Profession-building and never for a moment let it rest. Recognition will come, as the profession develops.

J. I. K.

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# ABSTRACT DEPARTMENT

**Optometric and ophthalmic Journal articles and reprints to be abstracted should be sent to Dr. G. L. DuPlessis, 209 Yeates Building, Minneapolis, Minnesota. Only papers of interest to optometrists will be reviewed in this department.**

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**Direct Ophthalmoscopy in High Myopia,** by **Dr. Alexander Garrow,** Glasgow, British Journal of Ophthalmology, July, 1927, p. 343.

In examining the fundus of a patient possessing a high degree of myopia one finds considerable difficulty in using the direct method of ophthalmoscopy and at times must be satisfied by merely making an indirect examination. In such cases Dr. Garrow finds the most satisfactory way of making a direct ophthalmoscopic examination is to have the patient wear his glasses during the examination. He claims that from his experience he is convinced that this method is worthy of extensive recommendation.

The fundus of a high myope wearing the full correction and examined by direct ophthalmoscopy is as clearly seen as that of an emmetrope, and under a similar condition of magnification. Incidentally, too, one knows at once if the patient is wearing the full correction.

The details of the choroidal and other changes associated with high myopia can be accurately examined and the progress definitely appreciated from time to time, and pathological changes of the disc can be very clearly seen, as in a case of glaucomatous cupping with atrophy in a patient whom he has seen from time to time and who has over 20 D. of myopia.

The method is even more useful in detecting lesser changes in the disc. In the ordinary direct ophthalmoscopic examination in the high degrees of myopia the whole field may be occupied by the disc and thus one does not get the same comprehensive view of it and the surrounding fundus as when the examination is made with the patient wearing his glasses. By the latter method, therefore, one gets the benefit of contrast between the disc and the surrounding fundus and it is thus more easy to appreciate departures from the normal colour of the disc.

There are certain difficulties in the method which have been minimized by practice. The greatest is the bright image of the light formed on the patient's glass. If this happens to be in the way, it can be got rid of by tilting his glass, a slight upward tilt is best. When an electric ophthalmoscope is being used this is easily done by holding the glass between the index finger and thumb of the unoccupied hand and slowly tilting the glass until the light image has been displaced from the pupillary area. When the peripheral portions of the field are being examined it is helpful to tilt the glass slightly towards the part examined.

When the ordinary ophthalmoscope is being used the method is more difficult and it is obviously necessary so to dispose the lamp and the hand which tilts the glass that there is no interference with the light in its passage from its source to the mirror.

J. I. K.

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**Myopia. O. Witte.** Zeitschrift f. Augenheilkunde, p. 163.

Witte presents some interesting statistical data on the subject of Myopia. Of a total number of 34,753 cases of the Greifswald clinic 13.8% were myopes; 66% were men and 44% women. Myopia of 10 D. and upward were

found mostly among women. Lower degrees of myopia were found largely amongst people who were doing work at the near point, the higher degrees were found amongst those who were not accustomed to use their eyes at near. Divergent strabismus was most prevailment complication. The vision was found to be more reduced in the higher degrees. Vision was also found to be more reduced in those who were not doing near point work.

J. I. K.

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**Emergencies in the Consulting Room. Everting the Lid. F. S. Oliver.** The Optician (British), June 17th, 1927, p. 301.

Oliver mentions several ways to evert the upper lid but the method favoured by him is as follows:

Assuming the right eye to be that under examination, the operator stands facing the patient and to his right side, the patient being comfortably seated and with his head thrown well back and reclining upon the head-rest of the chair. The patient is instructed lightly to close the eyes. The operator then places the tip of his left index finger lightly upon the upper lid, and pressing it gently upwards and backwards produces a slight degree of eversion. The tip of the thumb then drawing up the lower lid under the upper one, the free border of the latter is readily grasped and the lower lid is allowed to drop again.

The patient is now instructed to look at the tip of his nose or as far downwards as possible, simultaneously with which movement the operator turns over his hand supinely towards the patient's forehead, the tip of the index finger forming the fulcrum, which is, however, removed as soon as the fornix comes into view. The lid is kept inverted by the slight pressure upon the ciliary margin, the patient being instructed to maintain the downward direction of the eye.

When treating the left eye, the method is precisely similar, save that the operator stands to the left of the patient, and all movements are performed with the opposite hand.

T. O. B.

**Tints and Their Value, by Sir Arnold Lawson,** British Journal of Ophthalmology, November, 1924.

After experimenting considerably on tinted lenses and their value Lawson reaches the conclusion that in prescribing tinted lenses it is just as important to prescribe the thickness of the lenses as their tint. Two thicknesses of glass were used in the experiments, one 0.5 mm. and the other 2 mm., the latter caused a greater absorption of light. Lawson maintains that when tinted lenses are prescribed both the thickness and tint should be specified.

The following tints were used in the experiments:

Crooks—A, A2, B, B2.
Amber—1, 2, 3.
Fieuzal—1, 2, 3, 4, 5.
Peacock Blue.
London Smoke—2, 4.

The experiments showed that Peacock Blue gave by far the greatest protection for both the red and infra-red rays, and good protection for the violet. Fieuzal gave the greatest protection against the violet end of the spectrum. Crooks protected well against the violet end and, in the deeper shades, (B and B2) gave fair protection against the red end of the spectrum. The advantage of the Crooks lens was the uniformity and regularity of the increasing protection from the lighter to the deeper shade. Fieuzal was most irregular in this way, probably owing to lack of uniformity in manufacture. London Smoke gave good protection at the red end. Crooks B gave good protection throughout the whole range of the spectrum.

With regard to wearing tinted glasses, as stated before, Lawson emphasised the fact that a normal eye in its normal surroundings should need no protection. In extraordinary circumstances, such as mountaineering or in the glare of the tropics, it is generally the luminous and heat radiations against which protection is needed. Lawson would recommend Fieuzal tints, or, in extreme cases, Peacock Blue. In physical disease and in neurasthenia the tolerance to light may be reduced, and for such cases Crooks A or A1 may be used. This glass has the advantage of not grossly interfering with the general color scheme, but wearing such a protection should not be encouraged.

In cataract due to glass blowing it

has been shown that the infra-red rays are to blame, and in these cases Peacock Blue should afford the best protection. Lawson recommends Crooks A or A2 in cases of incipient cataract, and thinks this important. After extraction protection should be given, as the eye is now less well protected against the violet and ultra-violet rays, and Lawson advises Crooks A or London Smoke or Fieuzal. In active inflammatory disease of retina or choroid Peacock Blue should be ordered.

J. I. K.

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**Emergencies in the Consulting Room. Broken Artificial Eyes. F. S. Oliver.** The Optician (British). June 13th, 1927, p. 300.

One of the most awkward, if not the most serious in its results, of the consulting room emrgencies with which one may be called upon to deal at any moment is that of the "Snellen," or so-called "solid," artificial eye, which, owing to some imperfection in its manufacture, or the introduction of some "strain" as from exposure to a draught of cold air, etc., suddenly bursts or splinters while still in the patient's socket.

This emergency, fortunately, is of rare occurrence, particularly with the better made English eyes, but cases do occur from time to time with some of the lower priced Continental eyes, and he has well spent at least a few moments of his life who has learned the best manner of dealing with such an eventually whenever it arises.

When any foreign body enters the palpebral orifice one naturally "screws up" the eye-lids tightly in an effort firstly to oppose the entrance of any further undesirable substances, and secondly for the purpose of inducing a copious flow of lachrymal fluid or tears with which to dissolve or wash away the intruder.

In the case of the burst artificial eye it will be readily appreciated that this most excellent provision of Nature must be for the time being kept in check, or the result may be the imbedding of one or more splinters of glass into the muscles, conjunctivae, etc., or even the puncture and tearing of the lid.

When one sees some of the eyes which are being worn, and the terrible condition into which they are permitted to get before being returned for renewal or re-enamelling, one is inclined to wonder not that they do occasionally give way, but that they hold together at all. Within the last fortnight the writer has seen an eye with a crack so extensive as to separate almost completely the front from the back. There was, in fact, a "bridge" of glass barely 2 mm. in width keeping the two halves together; and when—for safety's sake—he lightly pressed on the edges and so caused the two portions to come apart, there flowed from the interior of the eye several minims of a particularly foul septic fluid. What, one wonders, would have been the fate of the stump or socket in that case if the severe irritation from the edges of the crack and the generally roughened surface of the eye (which looked almost as if it had been sand-blasted) had not compelled the wearer to stir himself and give the matter a little attention which was very obviously several months overdue?

Should such an emergency arise, one must insist that the lids are kept fully open, or that at any rate they are not in any way squeezed together nor rubbed with the hand or any other substance. If we are so fortunate as to see the case when no harm has been done to the tissues, and so there is no blood to intercept our view, it will usually be a fairly simple matter to get the patient to keep the head tilted slightly backwards, and to maintain a steady upward gaze, while we gently keep open the lids with the finger and thumb of one hand, and carefully remove the broken fragments with a small pair of forceps or other convenient instrument held in the other hand. In cases where the eye is simply cracked and has not actually come apart, or only a small portion has been broken off or fallen inside the main body of the artificial member, extraction may at times be better performed with the aid of the regular wire-loop "extractor," as in the case of a sound eye.

These accidents, fortunately, are somewhat rare, but when they do occur, they have a nasty knack of giving us "a run for our money," so that, instead of having just a cracked eye to remove, we are confronted with a client who suddenly cries out with pain or alarm (or both) and presses his handkerchief to his eyes, whilst between the lids these issues a more or

less severe flow of blood.

To attempt in such a case to pick out the pieces haphazard would be very unwise, since the density of the blood makes it utterly impossible for us to see what we are doing, and we might find it easier to add to the patient's discomfort than to remove the cause of it.

A better method of procedure in such an emergency would be to fill an "Undine" douche with normal saline solution (a solution of pure sodium chloride 0.9 per cent in distilled water at about 60 deg. F.), and to irrigate thoroughly the socket with the solution so as to wash away any blood or clots which obscure the view, and also to stop the flow of blood, since the saline solution acts as a mild haemostatic when used at a lower temperature than normal blood heat (98.4 deg. F.).

When the bleeding is under control and we can see what we are about, the removal of the fragments may be proceeded with as in the case of a simple break without injury to the socket or surrounding tissues. The socket should be again lightly douched with normal saline solution and very lightly covered with a gauze pad and bandage for a day or two to allow time for the healing of any scratches or cuts before the eye is replaced.

T. O. B.

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# SPECIAL REPORT

## AN OPTOMETRIC EDUCATION AND WHAT IT MEANS

It is well to stop at times and review the progress that has been made in matters of optometric education. Thirty years ago, most private optometric schools confined their work to things purely optical—subjects such as Subjective Refraction, Neutralization, Frame Fitting, Lens Centering, etc., etc., taking the major portion of the students' time, with but a smattering of physiological optics injected to give the students an idea of the functions of vision and with but small time allotted to the student for him to familiarize himself with the most frequently-met-with types of ocular pathology.

But all this has changed. No longer does an optometrist receive any such an education. Today in our Private Schools and our Universities the students receive as thorough a ground work in matters of general health as do the dental students and in their own specialized field are given as intensive a training as possible in every subject which will be of benefit to them.

Dean Albert Fitch of the Pennsylvania State College of Optometry, a private school, charted by the State, located in Philadelphia, and giving a three year course in optometry, in his recent Commencement Address, reviewed this splendid optometric educational progress as follows:

"These young graduates have just completed three years of the most intensive work in subjects that will best fit them to practice their chosen profession. For the benefit of those who are not familiar with what constitutes the curriculum necessary to prepare an optometrist for practise, I shall enumerate the subjects taught in this institution. They are mathematics, physics, chemistry, psychology, general and ocular anatomy and histology, general and ocular pathology, general and ocular physiology, geometric optics, ocular myology, optometry, clinical work in optometry and optometric mechanics.

The clock hours necessary to cover this course of three years are 3,780, which is considerably more time than is required by a University for a Bachelor of Arts degree. These graduates as a reward for the completion of this work, will receive a doctorate degree in optometry.

In speaking of degrees, I find a great many who held erroneous ideas on the subjects of college degrees. I am speaking, of course, of the earned degrees, and not of the honorary. Some people have an idea that the college degree is merely an ornament, and there may have been some justification for this attitude in the past when only the wealthy sought a college education leading, in most cases, to a degree in the college of Liberal Arts. In this, of course, the dominant idea was to obtain a cultural foundation.

Today, however, all degrees have an economic value because of great demand in almost all vocations for highly trained men, and the various degrees are evidence of the completion of so much fundamental training, either special or general.

The physician, perhaps, was the first to realize the true economic value of a degree and adopted the doctorate degree even when he read and studied in another physician's office, much as the lawyer formerly studied law in the office of another lawyer.

It is also true that while all degrees have an economic value it is only those following the healing arts and doing kindred work who use degrees in a vocational way. This is due to the belief of the public that any practitioner holding himself out as being able to relieve human ills or abnormalities must be a doctor—not necessarily a doctor of medicine for today the people have learned to discriminate between him and the doctor of optometry, doctor of dentistry, and doctor of osteopathy. I may say, further, without fear of contradiction, that so firmly are these titles imbedded in our complex social structure that should any profession relinquish the title it would find considerable difficulty in retaining the confidence of the public, and in cases where there is an overlapping of fields in any of the professions, the one still using the degree would eventually absorb the practise of the one relinquishing it. That optometry has both the moral and scholastic right to use the doctorate degree is so manifest that it needs no further discussion. It might, however, be interesting to know that this institution was in existence four years before we received the power to confer the appropriate degree from the State of Pennsylvania by special action of Legislature. Before applying for this power we made sure that we had the requisite qualifications to merit this action on the part of the Legislature and the Governor of Pennsylvania.

This enactment did not, nor did we intend it to, broaden our field of practise. Optometry is not only content with what it is legalized to do by the enactment of laws in every state of the United States and its foreign possessions, the provinces of Canada and Cuba, but feels that its field is of such proportions and magnitude that it will have its hands full keeping up with the development in its own field, without giving any thought to encroaching upon that of others.

I wish to stress these words I just uttered, 'its own field,' optometry's own field. Optometry has a field of its own and this field covers the diagnosis of eye discomforts and failing vision and the correction of all errors of refraction, the relief of muscular anomalies. The optometrist uses a varied assortment of precision and near-precision instruments for both diagnostic and treatment purposes and his prescriptions take the form of lenses and prisms only and his treatments include corrective exercises, fusional training, and mechanical stimulation. The work of the optometrist also includes the recognition of the local and general pathological conditions which manifest in the eye. If ocular pathology is manifest, the patient is referred to an ophthalmologist for treatment; if a systematic condition is the cause, or the partial cause of the ocular condition the patient is sent to the general practitioner of medicine for his co-operation; if the teeth are suspected as the seat of the trouble the patient is referred to the dentist. Thus the optometrist is taught to co-operate to the fullest extent with the other professions. Fortunately, however, the number of cases of the latter type is about 3% of the whole. These figures will be disputed by the medical eye specialist who depends largely upon refracting work, for to admit this contention of the optometrist would mean a grave economic loss, for it would be equivalent to an admission that medical refraction with the use of drugs is unnecessary, hence needless, which is just what the optometrist contends. Fortunately for the people and optometry, others beside optometrists upheld our contention and it might be of interest to give the opinion of two learned laymen whose opinion was concurred in by seven other learned laymen. I refer to the Honorable Judges Wilson and Audenreid and the members of the Supreme Court of Pennsylvania, who in 1914, in handing down their decree in making a temporary injunction permanent against the Medical Board who undertook to regulate Optometry as a minor branch of medicine, said, in substance, that Optometry is not a branch of Medicine

but a separate calling and had a prior right because it did the refraction work long before medicine undertook to do this work. It was clearly proved that medical men were taught to do this work by optometrists then known as refracting opticians. The fact that optometrists use the title "doctor" and a diagnostic instrument for the purpose of determining the presence or absence of pathology does not constitute the practice of medicine although the work of the optometrist and the ophthalmologist overlaps to some extent as does the work of all the professions applying the arts and sciences in the relief of human illnesses and abnormalities.

For the tone of the remarks of the bench and the written opinion of the honorable judges, I take it that they thought this condition quite natural and best suited for the interests of the public. That this condition is best, and is as it should be, is demonstrated when one looks at the art of medicine which is doing such wonderful work for mankind and whose progress to heights undreamed of a few years ago, is due largely to a system of using for its own purpose the results of the investigative and practical work of the sciences. Dentistry does likewise as does Optometry. Dentistry and Optometry bear about the same relationship to medicine, both requiring certain fundamental subjects common to both them and to medicine so that the practitioner of either optometry or dentistry should know the special expression of disease as it occurs in its particular field, not for the purpose of medical treatment but for the sole purpose of differentiating better between that which belongs exclusively to him and that which belongs to the practice of medicine in whole or in part. Beyond this point of contact the work of the dentist and the work of the optometrist are as far removed from the practice of medicine as the two poles are removed from the equator."

C. C. K.

# REPORTS AND ANNOUNCEMENTS OF SOCIETIES

**Official Organ of the Delaware, Iowa, Maryland, Minnesota, Nebraska, North Dakota, Oklahoma, and Vermont Optometric Associations.**


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### EYE-SIGHT CONSERVATION PUBLICITY

The American Optometric Association has arranged with a large Eastern Syndicate Service to put forth a constant stream of material stressing the need of visual care and the advisability of having proper optometric service. This publicity material will be sent to various publications requesting same, the expense to be borne by the Association.

### SAN FRANCISCO OPTOMETRIC SOCIETY

Dr. Frederick Woll of the College of the City of New York, and the Optometry School of Columbia University is giving a series of lectures before the San Francisco Optometric Society. His topics are anatomy and physiology with a portion of the time spent in dissection and microscopic work.

### CALIFORNIA STATE BOARD

Twenty-three graduates were successful in passing the recent examinations in optometry given by the California State Board. The successful doctors were: E. T. Brown, J. Chennell, Ray Dickey, C. W. Higgins, H. J. Greenfield, Hubert Kenyon, V. Lautz, Leon Lyon, V. O. Miller, E. C. Murphy, O. W. Nelson, Hazel Peterson, D. E. Raff, A. Reader, G. C. Rollins, J. P. Stewart, M. A. Stewart, R. M. Stewart, Ann E. Sutton, W. Selner, W. Widdows and J. Waller.

### OKLAHOMA ASSOCIATION OF OPTOMETRISTS

#### License Fee Renewal

Your annual license fee renewal was due July 1st and if it is not paid by July 31st your license is subject to revocation. The amount is $5.00 and should be sent to Dr. Frank H. Robertson, Secretary of the State Board, Blackwell, Okla.

#### Optometric Extension Fund.

The following have contributed to this year's special fund. This money will be

used for Law Enforcement, Clinics and Emergencies. If your name is not in this list better send in your check. Drs. B. R. Hubbard, W. S. Farmer, $24.00 each; Geo. W. Lewis, E. E. Russell, H. D. Brewer, P. W. Denney, V. E. Bowers, R. H. Hamm, O. L. Weeks, H. D. Brandt, W. H. Gumm, Floyd M. Sheets, W. C. Montgomery, Stewart Mitchell, W. C. Richards, D. C. Hoot, F. C. Walters, J. R. McCrary, N. O. Barnhill, C. T. Akers, A. R. Zellers, F. W. Holmes, G. A. Howe, H. C. Johnson, T. N. Batten, J. A. Clay, Edward Carr, W. K. Grady, W. A. Bundy, V. A. Batson, Geo. R. Holmes, Ralph Holt, J. E. Stanton, R. C. Everts, A. C. Lamb, Frank H. Robertson, W. A. Wright, H. S. Hannis, C. I. Hannis, J. W. Bishop, L. G. Dean, H. W. Mattox, C. H. Beavers, S. W. Northrup, and E. B. Alexander, $12.00 each; C. H. Dillingham and F. N. Ansel, $11.00 each; R. R. Fretwell and A. J. Shedivitz, $6.00 each; J. C. Diss and D. F. Kirk, $5.00 each; I. Angstreich, $3.00; and B. D. Faulkner, $1.00.

**Publicity Material.**

Your Association has also prepaired for your use two pieces of publicity material. These are to be used in a collective manner by the members and should prove very helpful in placing optometry before the public. The writer will be glad to place this material in the hands of any interested member.

**Law Enforcement.**

There are two types of violaters and each must be handled in an entirely different manner.

The first group: Unlicensed men practicing Optometry. In this case you get the evidence of his practicing and file charges with your County Attorney. Get all the evidence possible, but some person he has practiced on is sufficient. Call this office immediately. If you do not wish to file the charges yourself, the association will send a representative there to do so for you.

The second group: Violation of the Code of Ethics by a Licensed Optometrist. Get all the evidence of the violation possible and send to this office. We will then file charges with the state board of examiners and ask that his license be revoked. If you do not have a copy of the State Law or the Code of Ethics write this office.

E. B. Alexander, Opt. D.,
Secy.


ANNOUNCEMENT

THE PENNSYLVANIA STATE COLLEGE OF OPTOMETRY

announces the beginning of the new school year on September 19th, 1927.

The course includes general anatomy, ocular anatomy, pathology, psychology, chemistry, physics, mathematics, optometry, physiological optics, and clinics, and leads to the legally and educationally recognized degree of Doctor of Optometry.

All applications for admission to the entering class should be in the hands of the Registrar, not later than August 22nd, in order to receive proper consideration.

For application blanks for admission or for information and catalogue, address

The Registrar
PENNSYLVANIA STATE COLLEGE OF OPTOMETRY
Spring Garden at 10th Street Philadelphia, Pa.


**STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,**

of American Journal of Optometry, published monthly at Minneapolis, Minnesota, for July 25, 1927.
STATE OF MINNESOTA, County of Hennepin—ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Dr. Jack I. Kurtz, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the American Journal of Optometry and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Journal of Optometry Publishing Association, Minneapolis, Minn.; Editor, Dr. Carel C. Koch, Minneapolis, Minn.; Managing Editor, none; Business Manager, Dr. Jack I. Kurtz, 209 Yeates Bldg., Minneapolis, Minn.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given): American Journal of Optometry Publishing Association, 209 Yeates Bldg., Minneapolis, Minn.; Dr. Carel C. Koch, President, 209 Yeates Bldg., Minneapolis, Minn.; Dr. Jack I. Kurtz, Secretary and Treasurer, 209 Yeates Bldg., Minneapolis, Minn.

3. That there are no known bondholders, mortgagees, and other security holders.

(Signed) JACK I. KURTZ.

Sworn to and subscribed before me this 25th day of July, 1927.

NEITA C. ROBERTS,
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(Seal)
My Commission expires Jan. 3, 1931.

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For any further information write directly to any of these schools.

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